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## (54) Transportation containers

(57) A packaging container for transporting produce requiring refrigeration or chilling comprises a fluid-tight thermally insulated outer casing having a base 1, a side wall 2, a floor 6 separated from the base by supports 5 to define a cavity, and a lid 3, 4. The cavity is filled with absorbent material 8 (many listed), and the supports 5 are preferably projections formed on the base 1. The absorbent material 8, the floor 6, and the contents of the container including ice 10 may be enclosed within a fluid-tight membrane. The absorbent material absorbs ice water and exuded liquids. The supports and absorbent may be attached to the floor, or the absorbent may be a pod in a permeable membrane also containing the supports. The base and side wall may be integrally moulded from expanded polystyrene.

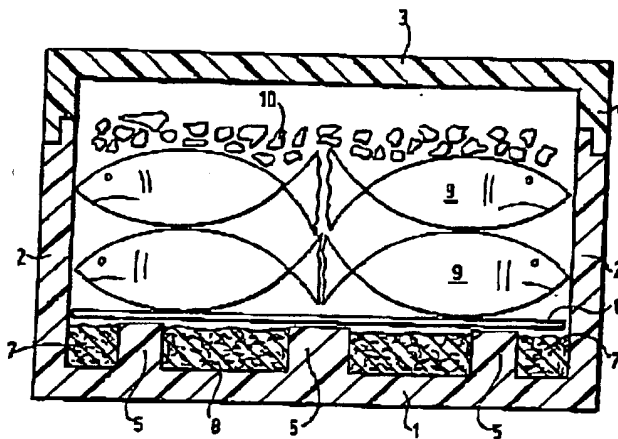


FIG.1.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.  
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1980.

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TRANSPORTATION CONTAINERS

The present invention relates transportation containers, and is particularly concerned with containers for transporting fresh or frozen food products such as frozen fish, or other products requiring refrigeration.

Conventional fish packaging for transportation from harbour to wholesale or retail outlets comprises placing the fish in boxes, covering the fish with ice, placing a lid on the box and transporting the boxes by road or rail.

This form of packaging has several disadvantages, in that if the boxes are not fluid-tight then leakage occurs as the ice melts, and a mixture of water and exudates from the fish flows from the box to contaminate the environment. If the boxes are in fact fluid-tight, this gives rise to a further disadvantage in that the lowermost layer of fish is immersed in a mixture of melted ice and fish exudates, this immersion being detrimental to the quality of the fish.

In order to overcome the disadvantages of the prior art, the present invention seeks to provide a packaging container wherein not only is any fluid contained within the package so as to avoid environmental contamination, but also the produce to be transported is kept clear of any fluids within the container so that its quality is not prejudiced.

According to the present invention, a packaging container for transporting produce requiring refrigeration or chilling comprises a fluid-tight thermally insulated outer casing having a base surrounded by an upstanding side wall, a floor positioned within the casing and separated from the base by a predetermined distance by means of supporting elements to define a cavity between the floor and the base, and a lid to close the casing.

Preferably, the cavity between the floor and the base is filled with an absorbent material. In a further advantageous embodiment, the absorbent material, the floor, the supporting

elements and the contents of the container are enclosed within a fluid-tight membrane. An embodiment of the present invention will now be described in detail with reference to the accompanying drawing, in which:

Figure 1 is a longitudinal cross-section of a container made in accordance with the present invention.

Referring now to the drawing, there is shown a packaging container comprising a base 1 and an upstanding surrounding side wall 2. The base is preferably rectangular in form, and is most preferably integrally moulded with the side walls 2 from a thermally insulating material such as expanded polystyrene or the like. This form of construction ensures a fluid-tight casing since the side walls 2 and base 1 are integrally moulded together. A lid comprising a top wall 3 and depending skirt 4 is provided, the top wall 3 being similar in dimensions and shape to the base 1, and the skirt 4 cooperating with the side walls 2 to provide a positive location for the lid onto the side walls 2 to complete the casing.

A number of upstanding projections 5 are formed on the interior surface of the base 1, the projections 5 being preferably formed integrally with the base 1 during the moulding operation. The projections 5 have substantially planar upper surfaces to support a floor panel 6, the floor panel 6 being spaced from the base 1 by a distance equal to the height of the projections 5. The volume between the floor 6 and the base 1 which is not occupied by the projections 5 forms a cavity 7, into which an absorbent material 8 is placed. The cavity 7 is preferably substantially filled by the absorbent material 8.

The produce to be transported in the container is placed on the floor 6. In the present embodiment, the produce is fish 9. To maintain the fish in a frozen condition, ice 10 is placed on top of the fish 9, and the lid is then applied to the casing. While ice is the preferred coolant, it is to be understood that other coolants may be used, such as solid carbon dioxide ('dry ice').

It will be understood that the thermally insulating nature of the base 1, side walls 2, skirt 4 and top wall 3 is such as to reduce the inflow of heat from the surroundings and thus retard the melting of the ice 10. However, the presence of absorbent material 8 within the cavity 7 beneath the floor 6 enables the absorbent material 8 to absorb any liquids either exuded by the fish 9, or produced by melting of the ice 10 or other coolant. Such liquids will flow down either round the edges of the floor 6, or through holes (not shown) provided in the floor 6 so as to be absorbed the absorbent material 8.

While the base 1, side walls 2, skirt 4 and top wall 3 are substantially fluid-tight, the production of these parts of the casing from expanded polystyrene material can mean that the casing is susceptible to leaking if damaged. In order to guard against the possibility of leakage from damaged casings, a flexible fluid-tight membrane can be disposed within the casing to contain the absorbent material, floor 6, fish 9 and ice 10. In order to produce such a package, the container is first lined with the flexible fluid-tight membrane by placing, for example, a polythene bag within the base 1 and side walls 2. The absorbent material is then laid into the bottom of the bag, filling the spaces between the upstanding projections 5. The floor 6 is then placed inside the bag to rest on the upper ends of the projections 5, with the flexible material of the bag interposed between the projections 5 and the floor 6. The container is then filled with produce such as fish 9, and ice 10 is placed on top of the produce. The flexible membrane or bag is then sealed, and thereafter the lid is applied to complete the casing. Using such a technique, damage to the relatively fragile outer casing will not result in leakage of any liquids from the container since these are all contained within the flexible fluid-tight membrane, and are held trapped in the absorbent material 8.

While the invention has been described in relation to fish packaging, it will be understood that the invention can be applied to the packaging of any materials or produce which requires both to be refrigerated and to be kept from becoming immersed in liquid.

In the embodiment shown, the floor 6 is held spaced from the base 1 by a number of protrusions 5 extending from the base 1. It is equally possible to produce a container having a perfectly smooth base 1, and to provide a number of downwardly extending protrusions from the floor 6 in order to provide a spacing between the floor 6 and the base 1. Likewise, it is possible to space the floor 6 from the base 1 by having a smooth base 1, a substantially planar floor 6, and a number of spacer elements separate from both the base 1 and the floor 6 and disposed therebetween. Such spacer elements may be joined together to preserve their relative disposition.

While the absorbent material 8 is illustrated as a fibrous mass, it is possible that the absorbent material 8 may comprise one or more pads of absorbent material contained by a permeable flexible casing. Such pads may be shaped to fit between the spacing elements or the projections 5 which are positioned between the base 1 and the floor 6. In an advantageous embodiment capable of being used with a conventional smooth-based box, the absorbent material 8 is formed into a pad having dimensions substantially equal to the internal dimensions of the base 1, the pad containing within its enclosing membrane a number of substantially rigid spacer elements predisposed within the pad to be situated at appropriate positions for supporting a floor 6 placed thereon. Thus, a conventional box may be converted to a box according to the present invention by placing such a pad within the base of the box and simply placing a substantially rigid floor element 6 over the pad. The floor element 6 will be preferably perforated to enable fluids to drain through the floor 6 into the pad.

The floor 6 is preferably formed from a substantially rigid plastics material, and is most preferably formed from a pair of thin plastics sheets separated by a filler sheet of corrugated form, or separated by a number of substantially parallel spacing ribs. Perforations, slots or other drainage openings may be formed in the floor 6 to assist the flow of liquids into the absorbent material 8.

As a further alternative, to provide an absorbent liner for use in conventional smooth-bottomed boxes, a floor may be provided with a number of legs to support the floor above the base of a box. Attached to the underside of the floor in the spaces between the legs is an absorbent material, the thickness of the absorbent material substantially equalling the height of the legs. A permeable membrane may enclose the absorbent material, to prevent loss in storage. In use the floor assembly will simply be placed in the box prior to filling in order to convert a conventional box to one according to the present invention.

While fibrous material is described for use as an absorbent, any conventional absorbent material may be used such as cellulose, fibre, sawdust, sphagnum moss or similar superabsorbents, or granular materials. If only small quantities of liquid are to be absorbed, for example if a relatively dry product is to be cooled using 'dry ice', then silica gel or similar desiccants may be used.

CLAIMS

1. A packaging container for transporting produce requiring refrigeration or chilling comprising a fluid-tight thermally insulated outer casing having a base surrounded by an upstanding side wall, a floor positioned within the casing and separated from the base by a predetermined distance by means of supporting elements to define a cavity between the floor and the base, and a lid to close the casing.
2. A packaging container according to claim 1, wherein the cavity between the floor and the base is filled with an absorbent material.
3. A packaging container according to claim 1 or claim 2, wherein the supporting elements are projections formed on the interior surface of the base.
4. A packaging container according to any preceding claim, wherein the absorbent material, the floor, the supporting elements and the contents of the container are enclosed within a fluid-tight membrane.
5. A packaging container according to any preceding claim, wherein the supporting elements for the floor comprise a number of legs attached to the underside of the floor, and attached to the underside of the floor in the spaces between the legs is an absorbent material, the thickness of the absorbent material substantially equalling the height of the legs.
6. A packaging container according to any preceding claim, wherein the floor is formed from a pair of thin plastics sheets separated by a filler sheet of corrugated form, or separated by a number of substantially parallel spacing ribs, and drainage openings are formed in the floor.
7. A packaging container according to any preceding claim, wherein the base is rectangular in form, and is integrally moulded with the side walls from expanded polystyrene.
8. A packaging container substantially as described herein with reference to the accompanying drawings.

7

**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

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**Relevant Technical Fields**

- (i) UK Cl (Ed.N) F4U  
 (ii) Int Cl (Bd.5) B65D F25D

Search Examiner  
 MR G WERRETT

Date of completion of Search  
 14 DECEMBER 1994

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant  
 following a search in respect of  
 Claims :-  
 1 TO 8

**Categories of documents**

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.
- Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 0997615	(H STANEK) see space 22	1, 2, 7
X	WO 89/10316 A	(REACO) whole document	1
X	US 5151568	(M D RIPPLEY)	1, 2
X	US 5135787	(DU PONT) whole document	1
X	US 4898273	(RENACO) whole document	1, 2
X	US 4869387	(RENACO) whole document	1, 2
X	US 4787532	(BILS PEDITON) whole document	1

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